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# The NATO Armaments Ballistic Kernel

6th International Cannon Artillery Firepower Symposium & Exhibition  
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## **Questions Addressed**

- **What is the NATO Armaments Ballistic Kernel (NABK)?**
- **Who are the developers?**
- **Why develop a Ballistic Kernel?**
- **How is the product being developed?**
- **What is the program status?**
- **What controls are on the information?**

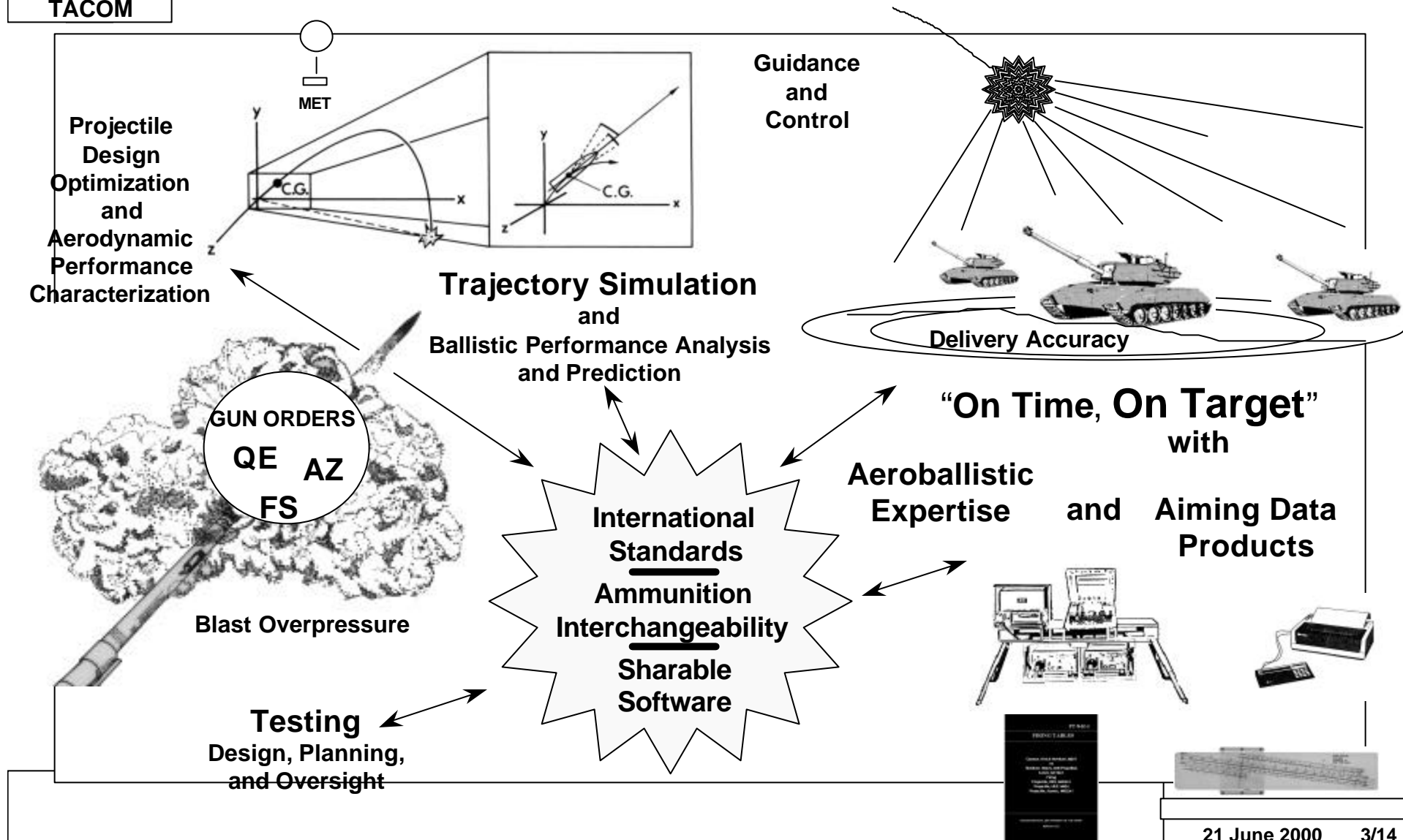


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### Fire Control Ballistics Domain

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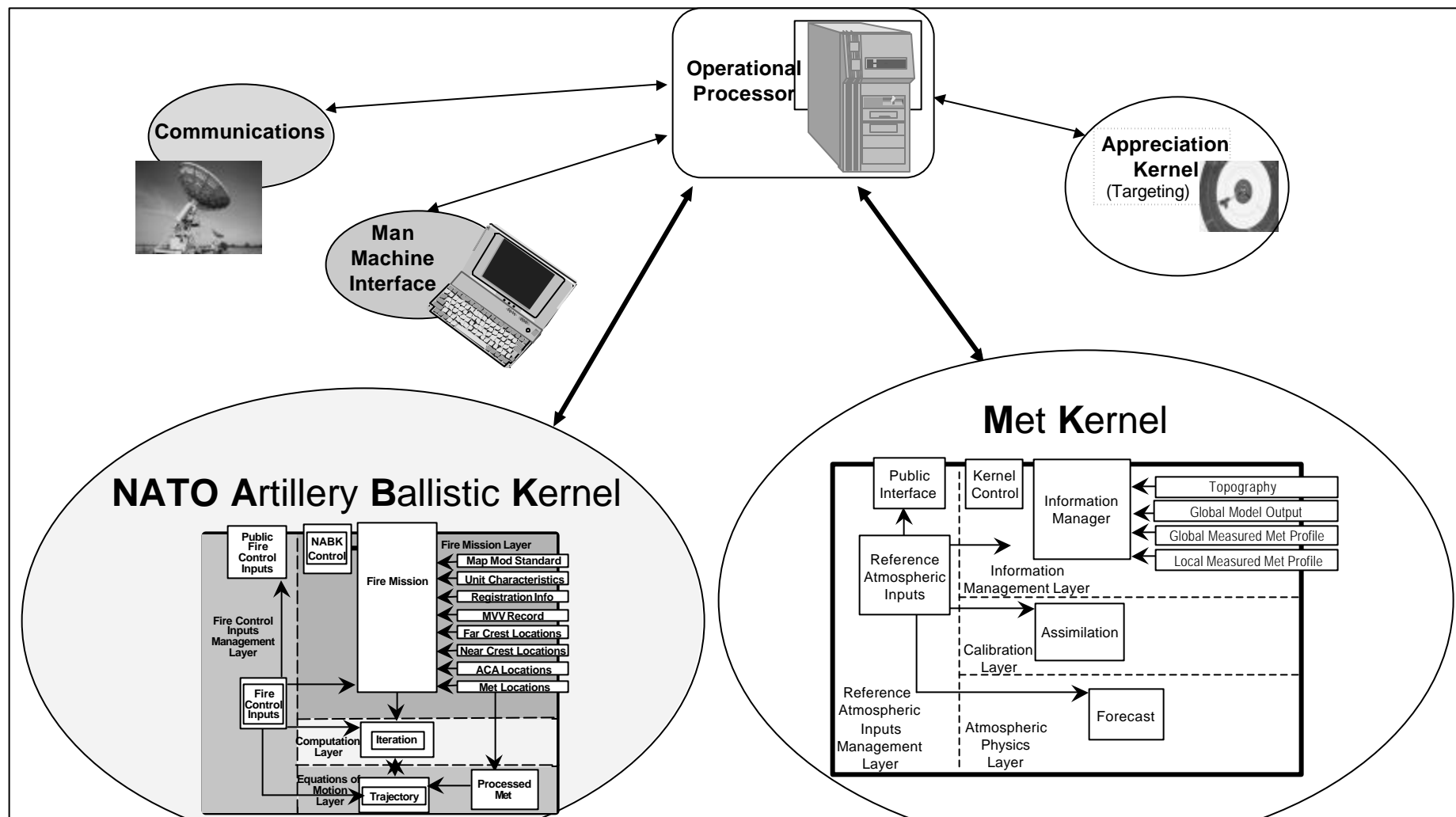




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## Sharable Fire Control Software Kernels



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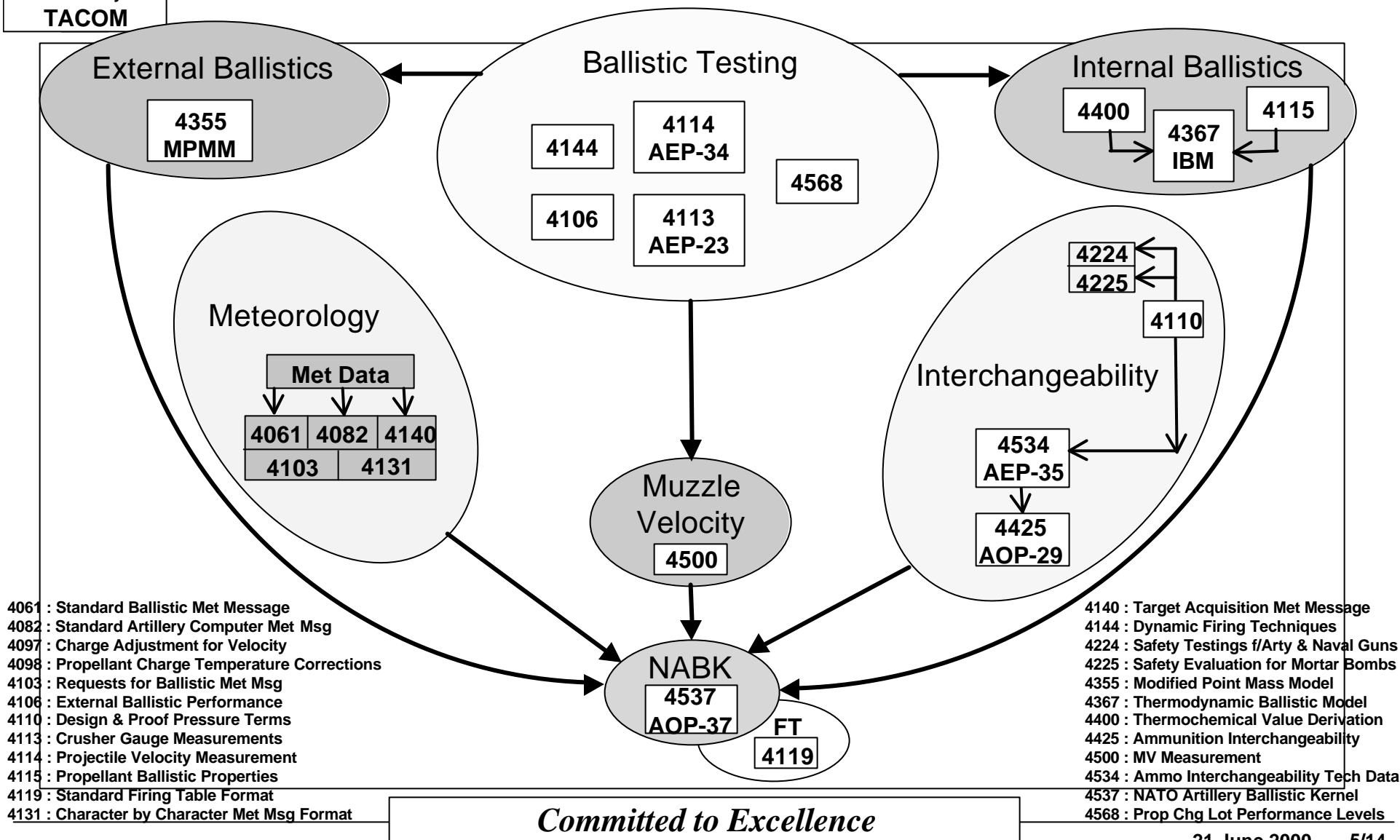


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### Supporting Standardization Agreements

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## **Developers**

- **International development effort under the auspices of the NATO Army Armaments Group AC/225 Land Group 4, Sub-Group 2 on Ballistics**
- **Current countries involved**
  - ❖ Belgium, Canada, Denmark, France, Germany, Italy, Netherlands, Norway, Poland, Turkey, United Kingdom, United States
- **Procedures being proposed to include participation by Partners for Peace through NATO member country sponsorship**



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## **Rationale for Program**

- To significantly reduce or eliminate duplication of effort by standardizing the implementation of NATO ballistic technology**
- To avoid significant expenditure of time and money in future development and updates of ballistic fire control software**
- To ensure accuracy and reliability**
- To establish a common method to facilitate the use of NATO ammunition interchangeability**
- To enable the horizontal integration of a digital component across all weapon systems**



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## **Development Process**

- **Program guidance (STANAG 4537) established**
- **Software development plan established and maintained**
- **Key areas managed:**
  - ❖ **Requirements, Technology, Database Development, Software Development, Configuration Management, Quality Assurance, Policy**
  - ❖ **Peer review integral to each area**
- **Program documentation (AOP-37 and feeder documents) established and maintained**
- **Overall program review held every 4 months early on and now every 6 months; appropriate persons in each key area communicate and meet as required**





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### **Key Design Goals**

- **Plan, design, and engineer the code for reuse**
- **Develop the software in the Ada95 programming language**
- **Allow Fire Control Inputs data to be updated without modifying source code**
- **Accommodate each country's Fire Control Inputs and the implementation of AOP-29**
- **Make the software configurable without modifying source code**
- **Check all input for correctness; verify the integrity of the Fire Control Inputs**



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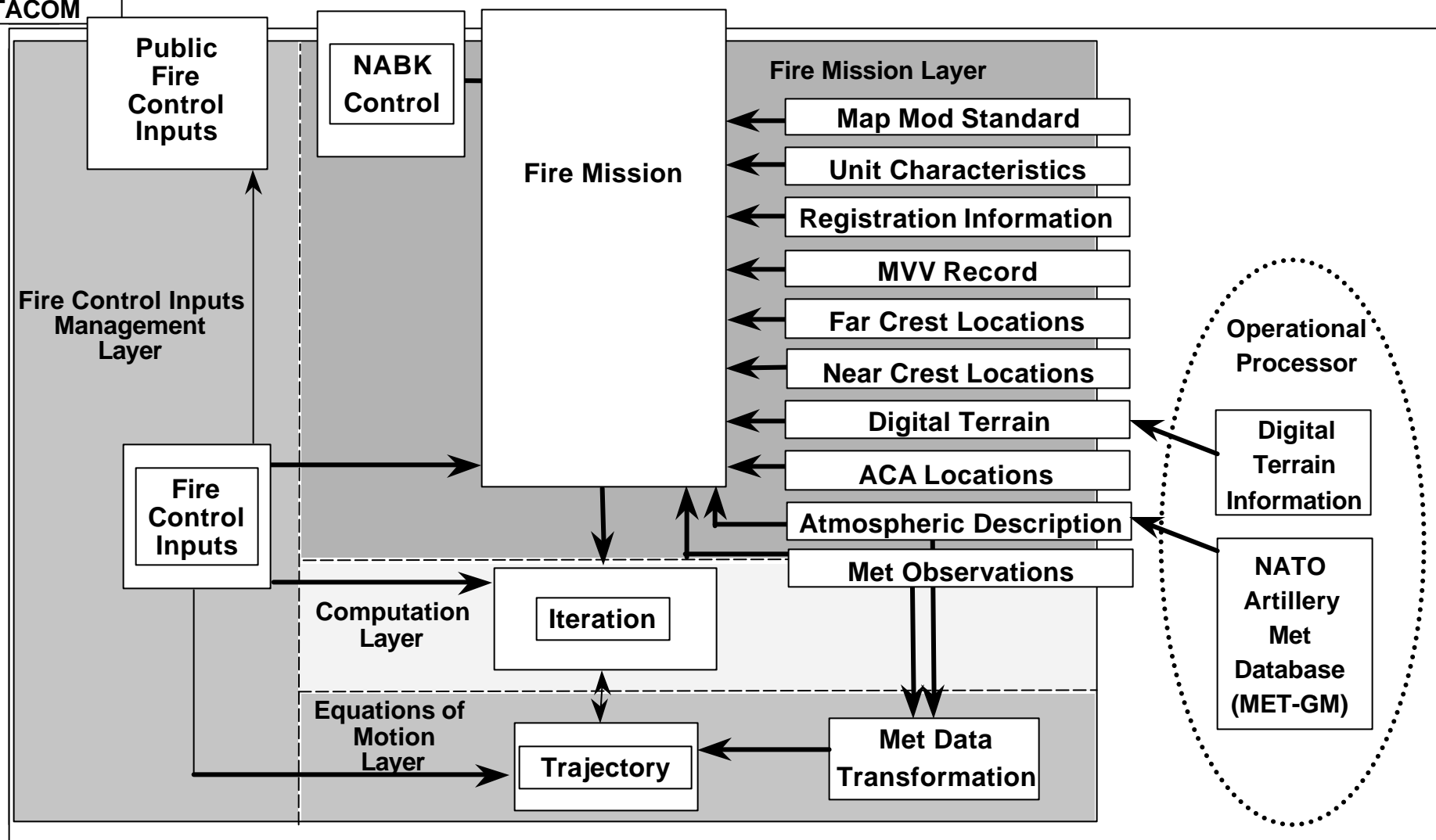


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## NABK Software Architecture



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## Current Status

- **Software releases:**

<u>Version</u>	<u>Release Date</u>	<u>Meets U.S. Requirements for:</u>
1.0	Sep 98	Dragon Fire Demo
1.0+	Dec 98	Paladin V11
1.1	Feb 99	
1.5	Jul 99	Crusader, MK 92
1.6	Sep 99	
1.63	Apr 00	AFATDS-99
2.0	Release scheduled for Sep 00	

- **Implementations are currently being worked by 9 countries**



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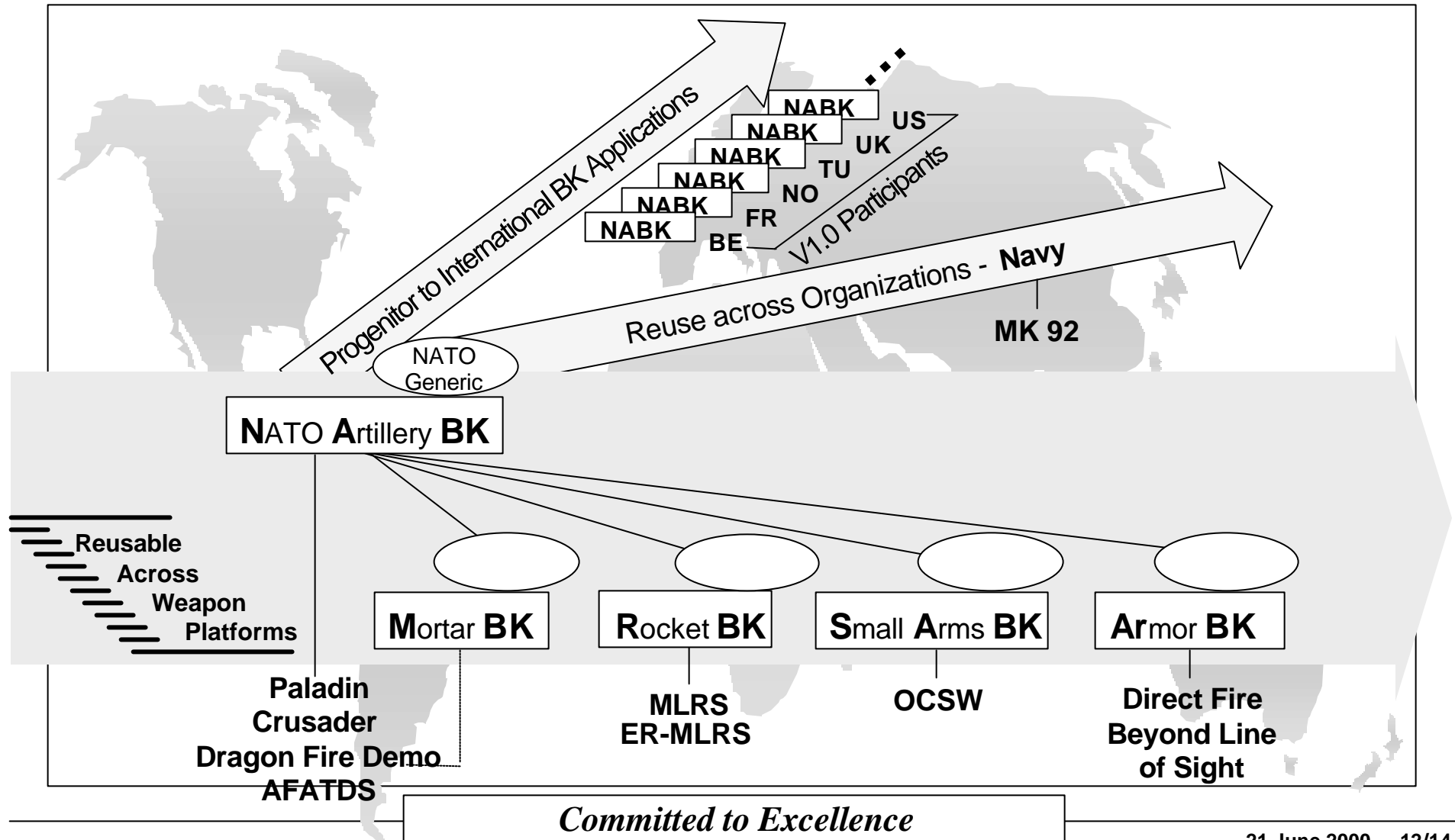


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## U.S. Derivative Applications of NABK Software





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## **Controls on Information**

- **Program guided by STANAG 4537 and documented in the associated AOP-37 and feeder documents**
- **All NATO member nations can implement the NABK into their national weapon systems**
- **Appropriate contractors must formally agree and adhere to non-disclosure and non-use criteria**
- **Only participating NATO member nations can sell a product containing the NABK (executable code)**
- **Procedures are being proposed to include participation by Partners for Peace through NATO member country sponsorship**



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## **Summary**

- **The NABK standardizes the implementation of NATO ballistic fire control technology in a reusable and sharable product**
- **Reliability is ensured through extensive code review and product use**
- **The NABK provides for horizontal integration across all weapon systems**
- **Life cycle maintainability and cost avoidance are being realized**